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NOTES ON THE OYSTERCATCHER (*HÆMATOPUS OSTRALÉGUS*), WITH REFERENCE TO ITS HABIT OF FEEDING UPON THE MUSSEL (*MYTILUS EDULIS*).

BY J. M. DEWAR.

To say that the Oystercatcher eats Mussels is to assert a commonplace. Yet little seems to be known regarding the methods by which the shells are opened and are deprived of their contents. Apart from the question of expediency, the absence of information on this subject may be attributed to the difficulties inseparable from close observation of birds that are wary and not easy to approach. Oystercatchers avoid those places which permit an observer to approach unseen, they act with great rapidity, their methods are varied within wide limits, and it is only by the exercise of much patience that results of any value are obtained. The present account is based partly on observations of the birds themselves, and partly on an examination of the empty shells which are scattered over the feeding-places.

Oystercatchers are creatures of regular habit; their timetable is regulated by the ebb and flow of the tides, which they follow with more or less precision. Speaking generally, it may be said that the Mussel-scalps extend across the shore from a line distant about one hour from the high-water mark to a line corresponding with the low-water mark of neap tides. The

Oystercatchers spend the time of high-water resting near the high-water mark. They fly over to the scalps exposed by the ebb, and occupy themselves with the uncovered shell-fish ; as the scalps become dry the birds turn their attention to the edges of the banks, the adjacent sand or mud, and the pools in quest of hidden Mussels. The period of slack water is devoted to repose, or is spent in other ways, and during the rise and flow of the tide over the scalps the Oystercatchers renew the search, until they are carried literally off their feet by the flood, when they betake themselves once more to the high-water mark. There is reason to believe that they are able to search effectively in the dark, and they are certainly active on moonlit nights.

The preceding paragraph shows that the Mussels must be surrounded by a certain amount of moisture if they are to meet the requirements of the Oystercatchers. With one exception, to which reference will be made, the Mussels which lie on the surface of the scalps are left alone when once they have become dry, and attention is concentrated on those which are covered by seaweed or by water, and on those which are buried in sand or mud.

The attitude of rest is one in which the valves of the Mussel are separated slightly along the free border, due to the tension of the elastic ligament ; the tight closure of the valves is caused by the contraction of the adductor muscles, and its maintenance implies continuous exertion. The attitude of rest is possible only when the shells are under water or in moist situations ; otherwise the delicate internal structures would shrivel. As soon as the shells become dry the Mussels must close their valves. Hence it is found that in the one case the shells are gaping slightly, in the other they are tightly closed. The former are liable to destruction by the Oystercatchers ; the latter, with one exception, as far as can be discovered, are invulnerable. It is essential that the moisture should be saline. Heavy rainstorms interfere with the search of the Oystercatchers by flooding the scalps with fresh water, which has the same effect as the drying of the shells.

Inspection of any scalps on which Oystercatchers have been feeding shows a litter of emptied shells. Some still lie in position on the scalps, others remain at the bottom of conical



excavations in the sand or mud, and many have been carried to bare patches of rock to be cleared of their contents.

Careful examination furnishes an important clue to the position the shells occupied during life, and therefrom to the manner in which they were opened. It will be seen that of the shells in which the valves are still united many have the dorsal borders uppermost, and a lesser number the ventral borders; and of the shells in which the valves have fallen apart, some have the ventral borders adjacent and others the dorsal borders. The position of these shells should be compared with that of the unopened Mussels on the banks. The majority rest with the dorsal borders uppermost, and are fixed securely to the ground by strands which emerge between the ventral borders of the valves. In few instances is the converse true. Occasionally they lie in a vertical position, the posterior ends being superior.

In the tightly closed shell the edges of the valves are in perfect apposition, with the exception of the middle portion of the ventral border. There a long and narrow fissure with rounded edges is present. This fissure is the weak point in the Mussel's armour, and it is seldom exposed on the open beds. Shells so placed are sought for eagerly by the Oystercatchers, and form the exception to the rule that dried and therefore tightly closed Mussels are left alone. When Oystercatchers are seen at work on dry Mussel-scalps it may be taken for granted that they are searching for these Mussels, and I have found repeatedly in these cases that only those Mussels were opened of which the ventral borders were uppermost. While the Mussels vary in size within wide limits, those which are attacked by the Oystercatchers agree closely in dimension with one another. One and a quarter inches to one and five-eighths inches in length by half an inch to three-quarters of an inch in breadth denote the normal variation. I have not seen Mussels of larger size than one and five-eighths inches by seven-eighths of an inch opened, and it would appear that Mussels smaller than one inch by half an inch are taken only when larger sizes are not available.

We have now to consider the way in which suitable Mussels are discovered, the manner in which they are opened, and how their contents are removed. Difficulties arise at once by reason of the variety of methods in use, the variable effect of these

methods on the shells, and the readiness with which the Oystercatchers adapt the methods to overcome varying and often unforeseen circumstances. I have thought it best to classify the shells according to the places at which they are opened, to describe the principal methods and their results in each class, and to mention some of the exceptions as they come under notice.

I. *Mussels opened through the dorsal borders.*

These form approximately seventy-eight per cent. of the shells opened by Oystercatchers. Bearing in mind that the Mussels in which the dorsal borders are present are the normal inhabitants of the banks, that they are available only when a sufficiency of moisture permits a separation of the valves, the reader will understand that the Oystercatchers must search for the gaping shells, and the birds are to be seen at these times walking sedately over the banks, their heads directed forwards, and their bills in a position ready to strike. Each Mussel is approached in the line of its major axis, and is submitted to a careful inspection, usually from the front, though why this should be I have not been able to decide.

If the Mussel meet with approval the Oystercatcher strikes a sharp blow with the point of its bill on the summit of the dorsal border, apparently to find out whether or not the bill will pass between the edges of the valves. Frequently this does not happen, and the bird continues the search. When the result of the tap is favourable the bill is pushed down into the Mussel before the valves have time to close by a number of jerks with great rapidity and force, until the deepest part of the much compressed bill comes to lie lengthwise between the margins of the valves. Usually further action is necessary, and it must follow soon after the introduction of the bill; but in a few instances the bird raises its head, looks about, and then proceeds leisurely to clear out the contents.

When this happens it is probable that the shell has been thinner than usual, and the stroke has not been delivered fairly between the valves; in consequence a small fragment of one valve is driven in before the point of the bill, and through the hole thus formed the Oystercatcher is able to extract the con-

tents. Occasionally empty shells are found which exhibit the depression of a fragment at the margin of one valve.

The simplest procedure is to shake or lever the bill violently from side to side, and is sometimes successful in separating the valves, as the Mussels are fixed securely to the ground. The two methods most in use may be employed independently one after another, or may follow the method just described, as circumstances require.

One method is as follows: The bill, sunk vertically between and in line with the valves, forms a pivot of a movement of the Oystercatcher to one side of the Mussel. As the Oystercatcher walks slowly round the bill turns through quarter of a circle and comes to lie with its greatest depth across the fissure, causing a marked separation of the valves. The same effect may be produced without moving the feet, by rotating the head to one side on a vertical axis. The other method is equally simple: The Oystercatcher lowers its head almost to the ground on one side of the Mussel, and the point of the bill, being well inside the shell, presses on the opposite valve which is separated widely from its fellow. This may have to be repeated several times. It is curious that, as far as observation goes, the Oystercatcher walks round or lowers its head to its own left side, and the left valve suffers more often than the right, because the bird approaches the Mussel more often from the front than from behind.

Now and again another and less simple method of opening the shells is seen. It may be employed from the first, or after other ways have been tried and have been found wanting. I have seen a group of Oystercatchers use it to the virtual exclusion of other methods for several days, and then apparently it was abandoned for months. This method requires that the bivalve be approached from behind. The bill is pushed downwards between the valves and behind the ligament, and perhaps, after ineffectual attempts to open the shell by lateral and rotary levering, the bill is drawn slowly and firmly backwards and downwards between the valves, until the head almost touches the ground behind the Mussel, and the bill, instead of being at right angles to the long axis of the Mussel, lies parallel to it between the margins of the valves at the posterior end. From

this position the bill is pushed in firmly until the point seems to reach the anterior end of the Mussel, when snapping motions of the mandibles occur, and are followed by gradual separation of the valves. It is plain that this method cannot be applied to Mussels buried in sand.

When the empty shells are examined it is found that, with the exception of those opened by the last method, one valve in each is fractured—that the fracture extends in most cases from a point on the dorsal border of the valve, one-eighth of an inch from the posterior end of the ligament, along a curved course following one of the lines of growth to the anterior end of the shell, and passes above the insertion of the anterior adductor muscle.

The upper and anterior fragment of the valve is raised by the passive contraction of the ligament, and its posterior free end is twisted outwards. Less frequently the fracture turns backwards instead of forwards, separating an upper and posterior portion from the rest of the valve. Occasionally the fracture extends transversely across the valve, isolating the posterior portion, and more rarely from the ventral border transversely across the valve to a point about a quarter of an inch below the posterior end of the ligament, and then horizontally to the anterior end.

In this case the lower and anterior portion of the valve is separated, the posterior portion united to the upper and anterior portion remains with the other valve, and from posterior end of the ligament is twisted markedly outwards.

It is noteworthy that the edges of the valves seldom show where the bill has been introduced. In the only example I have seen the margins of the valves a little behind the posterior end of the ligament were ground away, so that when the valves were brought together an elliptical hole was formed, which admitted the deepest part of a bill lengthwise.

It can be shown experimentally that the fracture starts at the place where pressure is applied, and when the lever is rotated between the valves it begins at that edge of the lever towards which pressure is directed. On a few occasions these processes were verified by observing the Oystercatchers at work, and afterwards by examining the particular shells they had opened.

II. *Mussels opened through the ventral borders.*

These amount to nine per cent. of the empty shells. Mussels in which the ventral borders are directed upwards are vulnerable at all times, and while the relative percentage is low the actual percentage may be as high as a hundred. When they are exposed to view on the banks they require no tentative inspection or tapping, and are opened at once. Oystercatchers can be seen to sight them from a distance, and to run eagerly to open them. The valves are separated in the ways which have been described, and whenever close inspection is possible the bill is seen to enter nearer the posterior than the anterior end of the fissure. The method whereby the bill, after being introduced, is lowered from the vertical to the horizontal position, and then pushed home to the anterior end of the shell, I have seen in use once with a shell of this class. It was employed after an ineffectual attempt had been made to separate the valves by a vigorous shaking of the bill sidewise. The snapping motions of the mandibles in the anterior end of the shell were followed by the gradual and wide separation of the valves, which were seen plainly to fall away from one another on to the sand.

Damage to the margins of the valves occurs seldom or never, and a considerable proportion of these Mussels is opened without fracture of the valves. When fracture does occur the right valve usually suffers, and the commonest form is a simple transverse fracture extending from the point on the margin of the valve where the bill was introduced to the dorsal border. Frequently a large quadrilateral fragment is separated from the valve opposite the posterior half of the fissure, and from the lower angles of the gap thus formed lines of fracture may travel to the dorsal border and to the anterior end.

More Mussels are opened by way of the ventral borders when buried than when exposed to view. Those Mussels are covered by a film of sand or mud, frequently as much as one inch in depth, and are found by a process of tapping the surface with the point of the bill. At first the ground is tapped here and there in tentative fashion. Sometimes a single tap leads directly to the Mussel; more often numerous taps are made in a small area until one is made in the right place, when the bill sinks quickly

into the sand and the Mussel is opened in one or more of the ways which have been described.

It is probable, as Macgillivray* suggested in the case of the Dunlin, that "they discover the object of their search rather by the kind of resistance which it yields than by touch like that of the human skin." Sand overlying smooth rock is equable to the touch, and I have noticed that the tapping instrument meets with greater resistance over the presenting border of a Mussel than elsewhere, but I have not been able to distinguish a Mussel from inanimate objects. Possibly the movement which the Mussel makes in closing its valves and drawing them more nearly to the rock is transmitted to the bill through the sand; the high proportion of hidden Mussels opened through the ventral borders, together with the circumstance that the relative frequency of the several positions assumed by the Mussel is not influenced by the presence or absence of overlying sand and mud, leads me to believe that it is so, and the movement which apprises the Oystercatcher of the presence of its prey often defeats the end in view, unless the ventral border of the Mussel is open to attack.

At these times delicate imprints made by the point of the bill are seen on the sand or mud around the scalps. Usually at wide and unequal intervals, in places they are crowded together, and there may be a few shallow probings, some of which are bridged by septa of sand or mud, showing that the mandibles are slightly separated. In several places these clear imprints are obliterated by footmarks, often deeper than usual; in the centre of each place there is a deep conical pit surrounded by ejected material, and the empty shell lies at the bottom, or it is found near by.

The Oystercatcher removes the Mussel from its anchorage under the sand or on the open banks from choice, or as the result of the undesirable attention of others, and to avoid the prolonged submersion of the head under water which extraction of the contents sometimes requires. A fine distinction is drawn between the shells of the two classes. Those which present the ventral borders are opened up before being detached from their foundations, while those in which the dorsal borders are present

* 'History of British Birds,' vol. iv. p. 212.

may have the valves separated slightly when the Mussels are in position, and the opening up completed at leisure after detachment. The reason is to be found in the characters of the two borders. Along the dorsal border the valves meet at an acute angle and rest insecurely on the ground, while on the other side they meet at an open angle, and are flat-bottomed like a barge.

The Oystercatcher empties a shell at the bottom of a deep hole in the sand as easily as one on the open ground.

After the shell has been opened the separation is effected by introducing the upper mandible within the shell, and by gripping a valve—usually the damaged one—between the mandibles, a few vigorous shakes and a pull in the upward direction being sufficient to detach the shell.

III. *Mussels opened through the posterior ends.*

Forming about thirteen per cent. of the shell remains, the valves of these Mussels are never fractured, and at most show some comminution of the thin posterior edges. The fragments remain attached to each other, and are not driven inside the shell.

It is, therefore, likely that the valves are separated to some extent before the bill is introduced. This can be the only route to the interior of the buried shells, the long axes of which are vertical, but in the case of Mussels placed horizontally on the banks it is not easy to understand why the posterior end of each should be chosen.

The method is simple enough. The point of the bill is inserted quickly between the valves and pushed home by a number of forcible jerks. Vigorous shaking of the bill sidewise follows, and is sufficient to open the shell. When the Mussel lies horizontally the Oystercatcher approaches from behind with its head lowered nearly to the ground, and the point of the bill directed forwards.

A feature which the shell opened at the posterior end exhibits more frequently, and to a greater degree than the shell opened by any of the other routes, is a partial rotation of one valve on the other, about a point situated near the middle of the ligament.

Among the litter of empty shells the presence of a variable number of unopened shells is of daily occurrence.

Some are quite uninjured, the margins of the valves are in perfect apposition, and are tightly closed. More commonly the valves of each Mussel are rotated partially on one another, so that the margins overlap, and a portion of the mantle is nipped between the edge of one valve and the inside of the other. When the valves are not shut firmly this rotation is produced easily by applying pressure to the valves in opposite directions; the Mussel makes no attempt to readjust the relative position of the valves, and slowly adducts them in their altered relation. As might be inferred from what has been stated, the right valve is as a rule lower posteriorly than the left, and the dorsal border is uppermost as the shell lies on the ground.

Shells which measure not more than an inch nor less than half an inch in length are searched for, and opened in the same way as the larger specimens, but the introduction of the bill and the subsequent manœuvres require less force, and are performed more rapidly. Frequently, however, the Oystercatcher approaches with the bill opened widely, and pushes the upper mandible between the valves; simultaneous rotation of the head to one side on a vertical axis and approach of the lower to the upper mandible follow, so that the upper mandible rotates into a transverse position within the fissure, and the posterior portion of one valve is crushed and twisted outwards in the firm grip of the bill.

Shells of half an inch by quarter of an inch and those of smaller size are torn from the rocks, one at a time, and are swallowed entire. Macgillivray,* speaking of the contents of the stomachs, states that the bivalve shells are generally, "when of small size, either entire or merely crushed"; and Professor Patten† has found "in several gizzards small bivalves with unbroken shells which measured 12 by 5 mm."

The greater part of the mollusc makes a few mouthfuls. Large pieces are torn away and transferred to within reach of the tongue by jerks of the head. At each projection of the head the bill, as it were, slides over the piece, and the return of the

* 'History of British Birds,' vol. iv. p. 156.

† 'Aquatic Birds of Great Britain and Ireland,' p. 249.

morsel is prevented by pressure of the mandibles and the reverted cusps on the palate.

When entrance has been gained through the middle part of a border, one end is cleared out first and then the other, the Mussel, if detached, being turned round by the Oystercatcher, and, if not, the Oystercatcher, after emptying the end farthest from itself, walks round to the opposite pole and clears out the other. When the chief part of the mollusc has been removed there remains material adhering to the inner surface of the valves, chiefly the mantle. To remove this material the bill is employed like a pair of scissors. It is laid flatly on the inner surface of a valve near one end, and as it is pushed forward it snips away the adherent flesh. After reaching the opposite end of the shell the bill is returned to one side of its starting point, and snips its way along a line adjacent and parallel to the preceding, and so on, until the adherent flesh has been removed from both valves. This skilful procedure is carried through rapidly without pause, and often without moving the shell. It is seldom seen towards the end of the feeding periods, and at these times shells are to be found in which portions of the mantle remain.

Consideration of the methods employed by the Oystercatcher leads to the conclusion that fracture and rotation of the valves are in no way essential to the complete exposure of the contents of the shells. This view is supported by the cases in which neither occurs, and by the position, relative to the Mussel, in which the bill is introduced. It will be seen that the bill is inserted in the posterior half of the commissure between the valves, and when the attack is made on the borders it is pushed down just in front of the posterior adductor muscle. In this position the bill separates the valves most widely where separation is most required. Observation proves that mere rotation of the bill between the valves is sufficient to rupture the fused portion of the mantle, and to impair the action of both muscles; they contract very slowly after slight extension. The wider separation, usually produced, tears the posterior muscle from its attachment to the valve, which forms the fulcrum of the lever, and the anterior adductor gives way in similar fashion whenever the valves are set farther apart.

The position in which the bill is introduced, the quickness with which the Oystercatchers remove the anterior and posterior parts of the molluscs, and the interesting cases in which the bill, after it has been sunk vertically between the borders, is borne down between the posterior margins, destroying on its way the posterior adductor, and is pushed on at once to cut through the anterior muscle, go far to prove that the Oystercatchers are acquainted with the position and relative importance of the two muscles, and fully realize the necessity for their early destruction.

The fractures, when they occur, depend primarily for their production on the relative strength of the shell, the adductor muscles, and the ligament; their situation and character are determined by the position in which the force is applied, the position of the muscles and the ligaments, and the direction of the lines of least strength in the shell.

In these notes I have attempted to describe the ways by which Oystercatchers deal with Mussels; I have shown how the Oystercatchers are limited to certain Mussels, how entrance to the shells is effected, how the valves are separated so as to prevent their adduction while the molluscs are being devoured; I have brought forward observations which seem to prove that the Oystercatchers, far from being actuated by blind impulse, on the contrary proceed deliberately to remove certain structures which hinder the achievement of their desires; and I may say with truth that we have in the Oystercatcher a living illustration of the principle of the lever, by means of which a comparatively feeble instrument is enabled to render the stoutest resistance of no avail.

It remains for me to point out that interest must centre largely on the manifold ways in which the bill is employed, and on the attempts which may be made to assemble its numerous modes of action in the order of their development in Time.

THE PENGUINS AND THE SEALS OF THE ANGRA DE SAM BRÁS.

BY JAMES R. McClymont.

PENGUINS were seen by the followers of Vasco da Gama in the Angra de Sam Brás on the south coast of Africa in the month of December, 1497, and in March, 1499. The anonymous author of a Roteiro of the first voyage of Vasco da Gama to India calls the birds "sotelycairos," which word is now written "sotilicarios." It is most probably derived from the Spanish "sótil," subtle.

The anonymous diarist tells us that the "sotilicarios" could not fly because they had no quill-feathers in their wings, that their cries resembled the braying of asses, and that they were as large as drakes.* Castanheda, Goes, and Osorio also mention the "sotilicario," and compare its wing to the wing of a Bat, and certainly, if the under surface of the wing was contemplated by these chroniclers, the comparison is not inapt. The last author whom I shall cite in connection with the "sotilicario" is Manuel de Mesquita Perestrello, who visited the South African coast in 1575. Professor Diogo Kopke quotes from a manuscript of his Roteiro in the Oporto Library to the effect that the wing-lets of the "sotilicario" were covered with minute feathers, and that they dived after fish for food for themselves and for their young, which were hatched in nests constructed of the bones of the fish which were caught by them and by Seals.†

There is nothing at which one can cavil in these statements unless it be at that which asserts that the nests were constructed of fish-bones, for this is not in accord with the observations of our contemporaries, who tell us that the nests of the Cape

* 'Roteiro da Viagem de Vasco da Gama em mccccxcvii,' Segunda Edição, Lisboa, 1861, pp. 14, 105.

† 'Roteiro,' p. 142.

Penguin (*Spheniscus demersus*) are constructed of small stones, shells, and *débris*.*

In the Angra de Sam Brás, which is believed to be Mossel Bay, or some other bay in proximity thereto, there were Seals in great numbers. On one occasion the Portuguese counted three thousand in the bay. Some were as large as Bears, and their roaring was like the roaring of Lions. Others were quite small, and these bleated like kids. The author of the Roteiro appears to think that there was more than one kind of Seal in the bay, but this is doubtful, for Seals of different species do not usually herd together. The difference in size and in power and quality of voice may be explained by supposing that there were differences of age and sex amongst the Seals; all may have been of that species upon which various names have been bestowed, as *Otaria pusilla*, *Arctocephalus delalandii*, and *A. antarcticus*. An adult male *A. delalandii* is recorded to have attained eight feet and a half in length, and cubs from six to eight months old measure in length about two feet and a half.† In the same bay Anchovies were plentiful, and were caught and salted for provisions on the homeward voyage.

I conclude by mentioning the animals which were observed in the earlier stages of the journey. In August, 1497, in which month the 'Sao Rafaell,' commanded by Paulo da Gama, in which our author sailed, was, I opine, slowly making its way across the Gulf of Guinea, birds which resembled large Herons were seen; these may have been Great White Herons on a migratory journey southwards. On the 27th day of October in the same year, when the vessels were nearing the south-west coast of Africa, Whales and Seals were encountered, and also "quoquas," ‡ which appear to have been Whales of a different kind from those named "baléas." On the 8th day of November the ships cast anchor in a wide bay, which extended from east to west, and which was sheltered from all except north-westerly winds. It was subsequently estimated to be sixty leagues distant from the Angra de Sam Brás, and as the Angra de Sam

* Moseley, 'Notes by a Naturalist on the Challenger,' p. 155.

† 'Catalogue of Seals and Whales in the British Museum,' by J. E. Gray, 2nd edition, p. 53.

‡ Can "quoquas" be "corcovas" and signify humpbacks?

Brás was also sixty leagues distant from the Cape of Good Hope, the wide bay in which the ships anchored must have been in close proximity to the Cape. The voyagers named it Angra de Santa Elena; it was probably the Table Bay of modern maps. On the Cantino Chart, which was drawn in 1502, the "G. de Sta ellena" is laid down in the position of Table Bay.

The Portuguese came into contact with the inhabitants of the country adjacent to the anchorage; they had tawny complexions, and carried wooden spears tipped with horns, bows and arrows, and Foxes'-tails attached to short wooden handles. These were probably used to brush flies away. Their food was the flesh of Whales, Seals, and Gazelles ("Gazellas"), and the roots of certain herbs. Lobsters* abounded at this anchoring-place. The diarist affirms that the birds were similar to the birds in Portugal; there were Cormorants, Wood-Larks, Turtle-Doves, and "guayvotas." "Guayvota" appears to be related to "guaiva," moat or ditch, and may signify a kind of water-fowl. M. Morelet translates by "mouettes," regarding "guayvota" and "gaivota" as synonymous.

* Crayfish ("Cape Lobster").—Ed.

ON THE LONGEVITY OF BRITISH ENTOMOLOGISTS.

BY W. F. KIRBY, F.L.S., &c.

SOME years ago I began to make memoranda on the longevity of British entomologists, and on recently mentioning it to my friend Mr. Distant, he was so much interested that he asked me to put together a few notes for publication. I have therefore compiled a statement of the ages at death of upwards of three hundred British entomologists, chiefly from Hagen's '*Bibliotheca Entomologica*' and the current entomological magazines, adding the date of death as a clue to any person who might wish to refer to the obituary of any particular entomologist.

I have included only *British-born* entomologists, omitting a few of whose actual birthplace there was some uncertainty. On the other hand, some names will be found (*e.g.* Walsh and Riley) whose work was chiefly carried on in America or the Colonies, and who died there. Again, a few names will be found better known in other branches of science than in entomology—such as John Russell Hind, the astronomer, who was probably the first English entomologist to form a collection of European Lepidoptera, as opposed to British Lepidoptera on the one hand and Exotic Lepidoptera on the other.

The names represent all ages at death, and all classes of society; but it will be seen that by far the larger proportion lived beyond middle life, and many reached an advanced old age. Consequently, the results are such that one might confidently recommend anyone who wished for a long life to turn entomologist; and the list should also be an inducement to insurance companies to grant reduced premiums to entomologists, as some of them do to teetotalers. It will be noticed, too, that entomologists of the seventeenth and eighteenth centuries also seem to have lived fairly long lives. The moral of the investigation seems to be a confirmation of the effects of an interesting occupation in conducing to long life.

APPROXIMATE AGES OF BRITISH ENTOMOLOGISTS AT DEATH, FROM
TWENTY-ONE TO NINETY-FOUR, WITH THE ADDITION OF THE
YEAR OF DEATH.

21 (1). J. W. Jobson (1880).	Henry J. Stevin Pryer (1888). F. G. Cannon (1906). Norman Dalziel Warne (1905). George Robert Crotch (1874).
22 (1). Robert W. Sinclair (1880).	38 (2). R. G. Keeley (1874). John Henry Leech (1901).
24 (1). John William Shipp (1898).	39 (3). Edward Doubleday (1849). Henry Waring Kidd (1884). Arthur Unwin Buttleby (1905).
26 (1). Waldo Irvin Bennett.	41 (2). Trovey Blackmore (1876). William Lello (1874).
27 (1). William Clayton (1890).	42 (4). Edward William Robinson (1877). William Molyneux (1698). Hugh Edwin Strickland (1883). Alfred Owen (1874).
28 (2). William Alexander Forbes (1883). William Wing (1885).	43 (1). Thomas Young (1820).
29 (1). Walter Philip Watson (1881).	44 (3). Frederick Octavius Pickard-Cam- bridge (1908). George Bennett (1848). Hamlet Clark (1867).
30 (3). William Arnold Lewis (1877). Arthur Sidney Olliff (1896). P. F. J. Lowrey (1831).	45 (2). William Ramsay McNab (1890). George Adams (1795).
32 (1). Arthur Bliss (1890).	46 (4). Howard W. J. Vaughan (1892). James Hamer (1887). N. C. Tuely (1879). William Elford Leach (1836).
33 (2). Henry Wyndham Vivian (1902). Ambrose Quail (1905).	
35 (1). James Mortimer Adye (1908).	
36 (2). John Bickerton Blackburn (1881). Henry Ramsay Cox (1880).	
37 (5). Francis Willoughby (1672).	

47 (4).

James Wood-Mason (1893).
 John Nathaniel Still (1895).
 John Anderson Cooper (1896).
 John Henry Fowler (1903).

48 (3).

Charles Horne (1872).
 Arthur John Chitty (1908).
 Charles Tester (1895).

49 (4).

William Garneys (1881).
 John Christopher Dennis (1898).
 James Anderson (1808).
 Andrew Melby (1851).

50 (2).

E. T. Atkinson (1890).
 Charles Healy (1876).

51 (6).

William Farren (1887).
 Thomas W. Wonfor (1878).
 George Newport (1854).
 Samuel Purchas (1628).
 Thomas Wilson (1887).
 William Watkins (1900).

52 (4).

Francis Archer (1892).
 Charles Wyville-Thomson (1882).
 Francis Buchanan White (1895).
 Charles Valentine Riley (1895).

53 (7).

Thomas Henry Allis (1870).
 Edward Daniel Clarke (1822).
 William Curtis (1799).
 Robert Smith Edleston (1872).
 George Guyon (1878).
 Edward Caldwell Rye (1885).
 S. C. Tress-Beale (1885).

54 (3).

H. Harpur Crewe (1883).
 Charles William Dale (1906).
 Thomas Moufet (1604).

55 (3).

John George Children (1832).
 Edward Horton (1870).
 John Keart Lord (1873).

56 (7).

George Carden (1894).
 Thomas Desvignes (1868).
 Robert Jameson (1854).
 Edward Ralph Pearson (1890).
 Richard Platt (1698).
 William Roxburgh (1813).
 Thomas Vernon Wollaston (1878).

57 (4).

Robert Bakewell (1867).
 Edwin Brown (1876).
 Clarence Fry (1897).
 Thomas Moncrieffe (1879).

58 (9).

Thomas John Bold (1874).
 Noah Greening (1879).
 Christopher George Hall (1890).
 John Hellins (1887).
 Abel Ingpen (1854).
 William Laycock (1870).
 William Miles Maskell (1898).
 Henry Salt (1877).
 Thomas Wilkinson (1876).

59 (7).

Thomas Eedle (1888).
 John Hill (1775).
 George Norman (1882).
 William Prest (1884).
 James Robinson (1878).
 John Sang (1887).
 John Sanders Stevens (1903).

60 (9).

William Gabriel Blatch (1900).
 Arthur Dowsett (1897).
 Edward Carteret Dobrée Fox (1906).
 Robert Francis Layne (1887).
 John Charles London (1843).
 James Francis Stephens (1852).

Charles Turner (1869).
Charles J. Watkins (1907).
James Trimmer Williams (1844).

61 (7).

John Berkenhout (1791).
Jean Baptiste Jos. Dormer (1902).
John Finlay (1897).
Robert Hind (1881).
Philip Brookes Moon (1904).
Charles Turner (1868).
Benjamin D. Walsh (1869).

62 (9).

James Batty (1893).
John Thomas Carrington (1908).
John Thomas Harris (1892).
George Shaw (1813).
George Perry Shearwood (1891).
Joseph Sidebotham (1885).
John Richard Wellman (1895).
Adam White (1822).
John George Wood (1889).

63 (6).

John Brooks Bridgman (1899).
Thomas Chapman (1879).
Philip Crowley (1901).
Alfred Ficklin (1902).
Alexander Henry Haliday (1869).
Osbert Salvin (1898).

64 (6).

George Barnard (1894).
John William Dunning (1897).
George Robert Gray (1872).
Henry Moss (1882).
William Henry Tugwell (1895).
Christopher Ward (1900).

65 (12).

Edwin Birchall (1884).
Henry Doubleday (1875).
Abraham Edmonds (1869).
Robert Hislop (1880).
John Hunter (1793).
Robert C. Robert Jordan (1890).
Beebe Bowman Labrey (1882).

Alexander Goulman More (1895).
Andrew Murray (1878).
William Edward Shuckard (1869).
John Scott (1888).
Francis Walker (1874).

66 (9).

Thomas Atkin (1879).
John Thomas Boswell (1888).
Benjamin Cooke (1883).
William Sweetland Dallas (1890).
John Ellis (1776).
William Hardy Haworth (1833).
Dionisius Lardner (1859).
William Swainson (1855).
William Farren White (1899).

67 (9).

Henry Walter Bates (1892).
E. C. Buxton (1879).
Joseph Chappell (1896).
Nicholas Cooke (1895).
Henry Deane (1874).
James English (1888).
Robert M'Lachlan (1904).
William Reid (1858).
Edwin Sheppard (1883).

68 (3).

Charles Golding Barrett (1904).
William Boys (1803).
John Turberville Needham (1781).

69 (7).

William Buckler (1884).
Thomas Carpenter (1831).
John Gray (1882).
John H. Hocking (1904).
Fred. Wollaston Hutton (1906).
Edward Wesley Janson (1891).
James Edward Smith (1828).

70 (9).

Mark Catesby (1749).
William Daniel Conybeare (1857).
Samuel Dale (1739).
Thomas Henry Huxley (1895).
William Wilson Saunders (1879).

Henry Tibbats Stainton (1892).
J. Aspinall Turner (1867).
Alexander Wallace (1899).
Alfred Henry Wratistlaw (1892).

71 (6).

Thomas Cooke (1885).
William Duppa Crotch (1903).
Ferdinand Grut (1891).
William Harper (1884).
John Kidd (1851).
William Macleay (1892).

72 (15).

George Bedell (1877).
John Ashton Bostock (1846).
John Charles Bowring (1893).
Henry Thomas Colebrook (1897).
Thomas William Daltry (1895).
Thomas Edward (1886).
(Archdeacon) Hey (1882).
Wm. Chapman Hewitson (1878).
John Russell Hind (1895).
William Martin (1894).
Edward Parfitt (1892).
Ebenezer Sabine (1902).
G. H. K. Thwaites (1882).
John Jenner Weir (1894).
William Yarrell (1856).

73 (7).

Joseph Sugar Baly (1890).
Daniel Barrington (1800).
John Harrison (1907).
Martin Lister (1711).
Wm. Humphrey Marshall (1818).
Georgiana Eliz. Ormerod (1896).
Frederick Smith (1879).

74 (10).

Frederick Bates (1903).
Alfred Beaumont (1895).
Charles Robert Darwin (1882).
William Gurney (1879).
James B. Hodgkinson (1897).
Allan Maclean (1869).
F. J. Sidney Parry (1885).
John Emmerson Robson (1907).

Sidney Smith Saunders (1886).
J. B. Wilkinson (1902).

75 (6).

Peter Collinson (1768).
H. J. Gore (1889).
John Edward Grey (1875).
George Haggard (1892).
Edward Newman (1876).
William Thompson (1892).

76 (8).

Robert Calvert (1891).
Henry Dorville (1874).
Henry Guard Knaggs (1908).
Thomas Ansell Marshall (1903).
John Arthur Power (1886).
John Ray (1704).
W. C. Unwin (1887).
Morris Young (1897).

77 (6).

Henry Baker (1775).
Joseph Banks (1820).
Walter Battershell Gill (1900).
Frederick Moore (1907).
Robert Sibbald (1720).
George Robert Waterhouse (1888).

78 (7).

Stephen Barton (1899).
William Chaney (1907).
William Derham (1735).
Philip Henry Gosse (1888).
Thomas Kelsall (1904).
Eleanor A. Ormerod (1901).
Sidney Smith (1885).

79 (6).

Edward Armitage (1896).
Frederick Bond (1889).
George Edwards (1773).
Neil McArthur (1879).
Fran. Polkinghorne Pascoe (1893).
W. H. Z. Walcott (1869).

80 (4).

James Scott Bowerbank (1877).

NOTES ON THE PIED FLYCATCHER (*MUSCICAPA ATRICAPILLA*).

By E. P. BUTTERFIELD.

EVER since my boyhood days a certain glamour has always clustered around the Pied Flycatcher, but it was not until the year (I believe) 1874 that I made my first acquaintance with this most charming bird. Previous to the above year I had heard of its breeding in Wharfedale. This, however, was said to be a very rare occurrence, but my brother James Alfred Butterfield, of Plumstead, and I decided on a visit to confirm or discard this record; so, as might be expected, neither of us was at all sanguine that our visit would be attended with success. However, after travelling about twenty miles, half of which was accomplished on foot, immediately on entering the wood, one can imagine our surprise when a fine male Pied Flycatcher was seen flying from one old oak to another in a small wooded dell, after which it was seen to enter a hole in an old oak tree, in which was found its nest.

An experience such as this comes to a naturalist but at rare intervals, and the above will always stand out as a "purple patch" in my life.

On subsequent investigation we found this species, within a certain limited area, to be not only common but what might be described as fairly numerous—as plentiful perhaps, or more so, than in any other of its habitats in Britain.

Scarcely a year has passed since my first acquaintance with this bird but I have paid a visit to its haunts, and this familiarity has been provocative of an ever-increased interest.

The distribution of this species in Britain is very peculiar, for, while it is said to have bred occasionally in the Southern Counties and Midlands, it seems to affect more particularly hilly and deeply wooded valleys where old timber abounds, but is by no means confined to districts which embrace such physical

features. It is locally common in some parts of Wales, and the same remarks are applicable to Yorkshire and Westmorland, but further north it becomes more scarce; whilst in Scotland it is a scarce breeding species, and in Ireland, where it was first recorded in 1875, it is still more so.

Regarding its distribution in Airedale, I have heard or known of but two instances of its nesting for over forty years—once near Malham, and once in the Goit Stock Valley. Once it commenced to breed in Bingley Woods, but was dispossessed by a Blue Tit from a hole in an old beech tree, nearly as soon as it commenced to build its nest.

What makes its scarcity in this district (Airedale) all the more remarkable is the fact that in not a few places the combination of physical features is almost identical with those which obtain in its haunts in Wharfedale, where it is so common; and, moreover, the Aire Valley would appear to be one of the migration routes to its more suitable breeding stations, since it is met with here nearly every spring in late April, but disappears after a very short stay. I am not aware of any instance of this species breeding in Lower Airedale. It has been seen at Collingham (Harrison), and a nest is said to have been found at Wetherby in 1889 (Stephens).

In the East Riding it is more to be regarded as a bird of passage, although it is said to have nested in one or two cases. Probably some of the individuals which nest in North-west Yorkshire and Westmorland work their way up the river valleys from the east coast.

Near Pontefract it has been observed, but whether it breeds there I am not in a position to say. At Roche Abbey, on the borders of Nottinghamshire, it is said to be a rare summer visitor, and so presumably breeds, but is a common breeding species at Stainborough Park, near Barnsley. North-east of Stainborough Park, in a line to the borders of Westmorland, it is but sporadically distributed, and has been reported as having bred at Huddersfield, Halifax, and Hebden Bridge (Nelson), but I am not aware of any recent occurrences within these districts. It is not included in the records of Upper Ribblesdale by Peake, but it breeds lower down the valley near Gisbourne. It appears to be absent in the Ingleton district. It is reported as having

been seen on the Wenning, near Bentham, on the borders of Westmorland, by James Moore in 1904, but whether on migration it is not stated ('Yorkshire Weekly Post,' June 4th, 1904). It has been found nesting in the Sedburgh district (Fortune), but must be considered as a very rare bird in that locality. In the 'Birds of Upper Nidderdale,' by Roebuck, Clarke, and Storey, the Pied Flycatcher is said to be a "local and not numerous summer visitant, breeding at Brimham, Guyscliffe, Pateley, Wath, and as high as Lofthouse."

I spent a few days near the head of the Wharfe a few years ago, making Buckden my headquarters, extending my investigations to Hubberholme, over the fells to Hawes, thence to Aysgarth and Bishopsdale, without ever seeing this species. Mr. Chapman, however, includes it in the 'Birds of Wensleydale' as a comparative rare summer visitant, and so mentioned as amongst the rarer birds that visit the district of Leyburn, and has been known to nest near Masham (Tinkler). A few breed annually near Richmond and Marske, but it is a rare and local summer visitant to Lower Sevaledale, and the same remark applies to the Barnard Castle district. It is locally distributed in the woods near Middlesbrough, and also in the Whitby district it is sparingly distributed. I have seen it near Mulgrave Castle Woods, and it occurs occasionally at Langdale Rigg, near Scarborough; also further west to Pickering and Kirbymoorside. Duncombe Park, near Helmsley, would appear to be its headquarters in the North Riding. Near the Cleveland Hills it is said to have occurred at Swainby. In the early sixties, however, I spent a month in Scugdale, which is adjoining Swainby, without ever seeing this bird, but it is possible it may have been overlooked, although this is difficult to conceive on account of its conspicuous plumage. Other localities in Yorkshire where this Flycatcher breeds are Hovingham in Ryedale, Bilsdale, Farndale, and by the River Wiske near Northallerton.

I have never found the nest in any other situation than in a hole of a tree varying in height from a few up to thirty feet, and is a slight structure, somewhat slovenly and similarly built, but not so substantially, as the nest of the Redstart. There are usually deposited five to six eggs, which have again a resemblance

to the eggs of the Redstart, and anyone who has observed the habits of this Flycatcher must have been struck with its close affinity to that bird.

Once I found the nest of this species in a hole in a mountain-ash, occupied by a pair, the male of which was in its immature plumage, and it was some time before I could discover which was the male bird. When hunting for insects it has a curious habit at times of dropping from some distance to the ground, returning to some dead branch. Like its congener, its spotted cousin, it is fond of building in the same place year after year, and rather courts than shuns the presence of man.

One of its provincial names is "Coldfinch." Whether this has its origin because it affects mountainous districts, or on account of its plumage, it is impossible to say; but whether this name "Coldfinch" is a misnomer or not, no other British bird can form a warmer friendship for man, and anyone who can lightly misplace its confidence, much less seek the destruction of this bird, deserves to be ostracised from the society of all true naturalists.

I very well remember the first and only time I saw the Roller in this district, and the first instance to come to my notice, after long years of searching, of the breeding of the Hawfinch; and my impressions on first seeing the Scotch Argus in all its glory in its only Yorkshire station, and my rapture at the first sight of the Clouded Yellow Butterfly in this district in 1876; but no witchery that can be conjured up from my memory can equal my first sight of the Pied Flycatcher. Since then my pilgrimages to its haunts have been many, and I trust they may be still more. It is the "White Admiral" among birds. Long may England continue to be a *dulce domum* to this charming and interesting bird!

NOTES AND QUERIES.

MAMMALIA.

Otters destroying Moorhens.—While fishing a few weeks since on a river in Westmorland, I happened to remark to the river-watcher that I noticed a great diminution in the number of Water-hens (*Gallinula chloropus*), and that now I did not see more than one where a few years ago I could count twenty. He told me that Otters (*Lutra vulgaris*) had recently taken to killing them, and showed me the mouth of a drain which was thickly covered with their feathers. This river is well stocked with trout, but contains few coarse fish or eels, which may possibly account for the changed habits of the Otters. I should be greatly interested to learn whether any of your readers have noticed a similar destruction of these birds on other streams.—R. H. RAMSBOTHAM (Elmhurst, Garstang).

AVES.

The Songs of Chiffchaff and Willow-Wren.—Col. Meyrick's note (*ante*, p. 190), headed "Mimicking Song of Chiffchaff," is very interesting. After describing the Chiffchaff as finishing its normal song with an exact reproduction of the song of the Willow-Wren, he asks whether there is any other possible explanation of its having the song of the two species, besides that of mimicry. I think it just possible that these two closely allied species had originally one type of song, that this was rather the Chiffchaff type than the Willow-Wren type, and that the Willow-Wren's notes have been added in the course of ages, just as the Lesser Whitethroat seems to have added its loud high notes to the normal Whitethroat song, which it still constantly utters in a subdued tone, before indulging in its own peculiar performance. This idea occurred to me as the result of hearing, on April 13th, 1897, as recorded in my diary, a Willow-Wren (apparently just arrived) singing but a few notes, and those notes curiously like the notes of the Chiffchaff. It may not be easy for anyone familiar with the two songs to imagine how this could be, but it undoubtedly was the fact that the bird was a Willow-Wren,

the song also a Willow-Wren's, but strangely modified so as to resemble the Chiffchaff's. There was a pair of Chiffchaffs mating close by, but I could not conclude that it was a case of imitation, for this was the first Willow-Wren I had seen, and the weather had been extremely cold. My own belief was that the bird, before acquiring its full song, had on its arrival unconsciously fallen back on the primæval song of its race. That Col. Meyrick's Chiffchaff should have added the Willow-Wren's song to its own may possibly mean that a Chiffchaff may, like the Willow-Wren, be inspired to add a strain to its own original song, but without abandoning the latter, as the Willow-Wrens have done. All Chiffchaffs, I may add, are well worth listening to with care; they differ among themselves curiously.—W. WARDE FOWLER (Kingham, Oxon).

Mimicking Song of Chiffchaff.—The song mentioned by your correspondent, Col. Meyrick, has been recorded by Mr. G. A. Dewar in his 'Hampshire Highlands,' and also by a lady who writes to the 'Hampshire Chronicle' under the name of "Caer Gwent." It is curious that it should have been so long overlooked.—J. E. KELSALL (Rectory, New Milton).

Lesser Redpoll Nesting in Middlesex.—As there do not appear to be many recorded cases of the Lesser Redpoll (*Linota rufescens*) nesting in Middlesex, the following note may be of interest. Last year several pairs of this Redpoll were to be seen daily about Hampstead Heath during the spring and summer, and were no doubt breeding there. I saw young broods, evidently not long out of the nest, accompanying the parent birds. In autumn the several family parties flocked and soon left, and I could not find any about here during the winter. This year two or three pairs of Lesser Redpolls returned to the Heath about May 12th, just as the birch trees were well in leaf. On May 28th I found a nest containing eggs, and upon which the female bird was sitting. This nest was placed in a fork at the end of a branch of a birch tree, and about fifteen feet above the ground. On the following day I found another nest about half a mile away from the first, which was also placed in a birch tree, being in a fork against the main stem and about twenty-five feet up. In this nest the female bird (June 1st) is still busy with the lining, which appears to be white vegetable down of some sort. As is usual with Redpolls, the birds at both nests are very confiding, and can be easily observed at close quarters through glasses.—H. MEYRICK (Holly Cottage, The Mount, Hampstead).

Note on the Great Spotted Woodpecker.—In February and March, 1907, I had opportunities in Switzerland of observing the habit of the Great Spotted Woodpecker (*Dendrocopus major*) recently detailed by Mr. Selous (*ante*, p. 81). Several times I saw the bird carry a fair-sized spruce-cone to the crevices, which were higher up than those described by Mr. Selous. The lowest I found was more than four feet from the ground, and one natural hole that the bird used was about ten feet up. All the crevices were in walnut trees, these being the only trees near. There was a large collection of cones at the foot of each tree, some hardly eaten at all, and others almost entirely demolished. On one occasion I saw the bird fly with a cone to the tree which it used most, but, finding the crevices there already occupied, it flew with the cone to another tree. It is perhaps also worth noting that three other species of Woodpecker—Green, Middle Spotted, and Lesser Spotted—were all to be seen frequently in the vicinity, but none of the others ever came to the spruce trees, the Green and Middle Spotted keeping to the walnuts, and the Lesser Spotted chiefly to a row of poplars.—H. G. ALEXANDER (3, Mayfield Road, Tunbridge Wells).

Great Northern Diver and Eared Grebe.—Referring to the article on "The Birds of Staines" (*ante*, p. 137), may I venture upon a couple of remarks? From the author's description of the habits of the bird he calls a Great Northern Diver (*Colymbus glacialis*), I think the bird must have been the Black-throated Diver (*C. arcticus*), the two being very difficult to distinguish at a distance by their plumage only, when in winter dress, their behaviour being a better guide; and, from his description of the behaviour of this particular bird, I should have little hesitation in calling it a Black-throated Diver. Personally, I can only distinguish the two by their habits when in winter plumage, and I have repeatedly watched them in Orkney. With regard to the Eared Grebe (*Podiceps nigricollis*), although the upward bill to the beak is a certain guide to the species when in the hand, I very much doubt—in fact, am practically certain—whether this could be seen in a free bird, even were it within a yard of the observer, and when in winter plumage the two are very difficult—indeed, almost impossible—to distinguish, unless it be by the slightly smaller size and shorter beak of *P. nigricollis*. Of course, the name Eared Grebe is very misleading, as the Slavonian species (*P. auritus*) in summer plumage has far more right to the name, and the so-called Eared Grebe is now as often known as the Black-necked, which its Latin name (*P. nigricollis*) signifies, and which is a much better name for it, as I have

repeatedly seen Slavonian Grebe in summer plumage called Eared Grebe, and do not wonder at the mistake, as they are far better named by their Latin name (*P. auritus*).—H. W. ROBINSON (Lansdowne House, Lancaster).

Ornithological Notes from Mayo and Sligo.—The unusually cold, wet, and stormy weather during March and April, combined with the long continuance of high northerly, north-west, and north-east winds, and the three days' snowstorms from April 23rd to 26th, delayed the arrival of many of our spring visitors, and also had the effect of driving many of our resident small birds far inland for shelter from the bitter northerly gales; and the consequent result is that very few of the latter returned to breed in their old haunts about here. The Chaffinches, Yellowhammers, and the three species of Tits appeared to be the only birds that held their ground. Blackbirds were in fair numbers, but not as many as last season, while the Song-Thrushes were remarkably scarce. Only two pairs were observed about this place, when in other seasons many pairs bred in the garden and plantations. Only one pair of Greenfinches bred in the garden this season, where several pairs had nests, and also about the place in other years. Even Sky-Larks deserted our fields, and very few Meadow-Pipits remained. Altogether the scarcity of our resident small birds is very remarkable. The Sandwich Terns were unusually late, not appearing in the estuary until April 17th, which was strange, because several were observed on Lough Conn on the 12th, showing that they kept to the open bay, probably from scarcity of food inside the estuary. Whimbrels were heard on the 30th, as usual appearing by May 1st, or a day or two earlier, this season. On April 29th I observed a Common Sandpiper, the first time I ever saw one on the shore here in spring, though they always put in an appearance on their return from the inland breeding haunts. A few Swallows appeared on the 18th on the Bunree River, near Ballina, but it was not until the end of the month that they spread out over the country. On May 2nd Little Terns were seen on the estuary, and by the 11th the three species—Common, Arctic, and Little—were in large numbers fishing about the estuary. The White Wagtails visited Bartragh on the 6th inst., when eight birds were seen, but evidently did not remain for any time. However, on the succeeding day (the 7th) Captain Kirkwood had the pleasure of seeing a fresh arrival of ten birds. He was in his garden when he was attracted by the sight of some small birds flying high overhead; these, when passing over, suddenly lowered their flight and dropped down outside

the garden-wall, on a marshy flat between the garden and shore (the usual haunt of these visitors on their first arrival on the island). The birds appeared tired and very tame, and allowed an approach within eight or ten yards. I do not know how long these birds remained, but several were seen on the 9th and 10th, and when I visited the island on the 11th I was just too late to see a pair that had been on the island before I landed. On the same day, when going to Bartragh, a flock of about fifty Dunlins in full summer plumage passed our boat, flying up towards Castleconnor, and later I observed as many others feeding on the sands, while a small flock of eight or ten fed in a little bay by the marsh in which they bred last year; these kept by themselves, and occasionally fled to and from the marsh, as if thinking of nesting there again this season.

In last month's 'Zoologist' I was very much interested in Col. H. Meyrick's account of a Chiffchaff mimicking Willow-Wren's song, for a somewhat similar case came under my notice on April 22nd, 1887. I was passing a small plantation here when I heard feeble, subdued notes of Willow-Wren and Chiffchaff. The weather was cold, and as on their first arrival these birds' song is always affected by the state of the weather, I thought both birds were trying their notes. I listened and watched for some time, but could only see one bird (a Chiffchaff), and he began with two or three notes of the Willow-Wren, ending with the Chiffchaff note, twice repeated. I listened and watched for a long time, until I satisfied myself that only the Chiffchaff was in the plantation.

In Mr. C. Oldham's "Field-Notes on the Birds of the Ravenglass Gullery" (*ante*, p. 166), I was pleased to see that the Sandwich Terns were breeding in company of Black-headed Gulls, confirming my observations, on this west coast, that in every breeding haunt of Sandwich Terns that I know of these birds associate with the Gulls, and not with the smaller Terns. At Cloona Lough, Rathroneen Lough, Lough Conn, and Lough Erne all the colonies were alongside of or among Black-headed Gulls. At the great breeding haunt of Arctic Terns on Ardbolan Island, off Drumeliff Bay, Co. Sligo, no Sandwich Terns breed, nor among the many hundreds of Arctic and Little Terns on the western end of Bartragh Island.—ROBERT WARREN (Moy View, Ballina).

Notes on the Birds of West Renfrewshire (Caldwell District), 1907.—

January 10th. — Song-Thrushes have returned to us after two months' absence.

13th.—Watched the Dipper to-day bathing itself as a Duck does,

then preening its feathers. Its mate sat silently watching the performance till its completion, when both flew down the stream.

17th.—Pair of Goosanders on the loch.

18th.—A male Golden-eye on the loch.

20th.—Thirty-five Pochards are on the loch. Blue Tits are very plentiful.

24th.—Snow falls to-day, followed by frost.

February 13th.—Storm still holds on.

16th.—Snow and ice gone. Saw a solitary Brambling. Song-Thrush singing for the first time.

17th.—Heard the Mistle-Thrush this afternoon.

21st.—Saw five Bramblings this morning. There were twenty-seven Pochards, four Mallards, and five Tufted Ducks—four males and one female. The latter was behaving in a most excited manner, standing up and beating the water with her wings, while the males did not seem to pay any attention. This continued all the time I watched them.

23rd.—Lapwings are now plentiful.

25th.—Heard the Blackbird sing to-day.

26th.—Chaffinch and Greenfinch in song. Walking home in the moonlight, about 10 p.m., I heard the "drumming" of the Snipe. The Tawny Owls were very noisy.

27th.—Sky-Lark sings to-day.

28th.—First spring call of the Lapwing to-day.

March 2nd.—Saw the Yellow Bunting this morning, and heard the Redshank for the first time this spring.

3rd.—Curlews have returned to-day to their nesting quarters.

6th.—About one hundred and twenty Pochards on the loch, also Tufted Duck and Mallard.

7th.—Saw a Heron flying low over the loch to-day, when a Pochard rose with extended wing as if to strike it. The Heron evidently thought so, as it immediately rose higher in the air.

8th.—Saw a Rook standing on the head of a sheep as it lay peaceably.

10th.—Four inches of snow this morning. Heard the Goldcrest to-day.

16th.—Two pairs of Golden-eye on the loch. Dipper's nest to-day with four eggs.

23rd.—About thirty Fieldfares flew overhead.

25th.—Grey Wagtails have returned. Saw a Water-Rail to-day. Great Crested Grebe has returned.

29th.—Three Goosanders on the loch.

30th.—Watched some Coal-Tits for a while.

31st.—Saw the first Lapwing's egg to-day, also a pair (male and female) of Wheatears.

April 6th.—Spent to-day in the rookery. Found two nests with six eggs, and several with five; also one nest containing young birds. Forty Fieldfares flying north-east.

7th.—Every place white with snow. Fieldfares abundant, passing over us.

8th.—First primrose shows itself to-day.

9th.—White Wagtail at the loch.

19th.—Fieldfares have been passing in small flocks for some days. To-day I saw about fifty flying north-east. Moorhen's nest with eight young ones.

23rd.—Sedge-Warbler seen to-day.

24th.—Common Sandpiper arrived; last year the date was the 12th, which is about the usual.

28th.—The keeper's dog to-day flushed a Land-Rail from some gorse. This is the earliest record I have. Found a Red Grouse's nest with ten eggs.

30th.—Two Snipes' nests, each with four eggs.

May 3rd.—Went to-day to examine some Jackdaws' nests built in spruce-fir trees. They are very large structures, being roofed over with sticks, just leaving a hole large enough to admit the bird. One of the four I examined containing eggs was quite open. The keeper told me he found in the last week of April a Woodcock's nest which was "run."

5th.—Heard the welcome sound of the Cuckoo's voice.

6th.—A Curlew's nest with four eggs. I got near enough to flush the bird from her nest—a most unusual experience.

7th.—Barn-Swallows arrive.

8th.—Met the assistant keeper to-day with a young Tawny Owl in his pocket. It was found in the "Crow Wood," and bore marks of having been pecked by the Rooks.

9th.—Heard the Land-Rail "craking."

11th.—Found another Red Grouse's nest with ten eggs, hatched. There were four pairs of Golden Plovers, but I could not find a nest.

12th.—Sedge-Warblers abundant and in fine song.

16th.—Water-Rail's nest with seven eggs; also three Mallards nests with seven, five, and one egg respectively.

17th.—Dunlin's nest with four eggs, and also Curlew's with four eggs.

18th.—Saw Common Whitethroat and Spotted Flycatcher to-day.

27th.—Saw for the first time a Curlew's nest, with the four young birds still in the nest.

[Absent from home most of June and July.]

June 30th.—Cuckoo last heard calling in the district.

August 7th.—Saw a solitary Land-Rail.

September 3rd.—There is ice on the water this morning.

26th.—Swallows and House-Martins gone.

October 1st.—Pochards have returned to the loch.

4th.—Dipper in fine song.

6th.—Blackbird sings for about half an hour to-day. Four Red-wings flew past, going south-west.

9th.—Five Swallows to-day—must have been a late nest.

16th.—Watched a Fox for a while this morning.

20th.—Flushed eighty Snipe (Common) from the coarse growth at the foot of the loch.

25th.—Tufted Duck on the loch; they now nest every year in this district.

26th.—A few Fieldfares.

27th.—Large flock of Fieldfares.

November 23rd.—Saw a lovely cock Bullfinch to-day.

24th.—Went to the loch this morning, with pleasing result. There were twenty-eight Mallard, five Wigeon, one pair of Golden-eye, one pair of Teal, thirty-one Pochards, and fifty Coot. From the coarse growth at the foot I succeeded in putting up two hundred and forty-seven Common Snipe, and do not think I shifted them all. I saw fifteen Bramblings among the beeches in the wood.

December 1st.—A solitary Pied Wagtail to-day.

7th.—Saw the Marsh-Tit to-day; they are not easy to watch, being much more shy than any of the other Tits.

9th.—Three Long-tailed Tits.

15th.—Had another try at the Snipe amongst the coarse growth at the loch, but only succeeded in putting up one hundred and eighty. They are very difficult to move, rising in fives and tens, and thus making it easy to count them. Jack-Snipe have also been fairly common this winter. The under-keeper told me he saw five Grey Geese (species unknown) about the middle of December on the loch.

These notes are sent in the hope that they may prove of interest to some south-country readers by way of comparison.—T. THORNTON MACKETH (Hall of Caldwell, Renfrewshire).

Notes from Shipley District.—

March 29th, 1908.—Fairly large flocks of Pied Wagtails noted on the River Aire between Saltaire and Bingley, as usual, at this time of year, composed mostly of males. On the 31st Pied Wagtails were simply swarming—hundreds were seen on the same stretch, also one or two Grey Wagtails. One Sand-Martin—an exceptionally early arrival, particularly so when we consider the Arctic weather we have had this spring. This bird seemed strong on the wing, securing its food off the stream, hovering like a Wagtail, and picking something as it floated down stream; although I was within two yards of it frequently whilst thus engaged, I could not make out any fly on the water.

April 2nd.—On same ramble, when only very few Pied Wagtails were noted, and these seemed in pairs; wind S.S.W. and decidedly warmer, later in day N.W. No Sand-Martin. Perhaps it had returned south, as Seebohm pointed out that birds frequently arrived too early in the extreme north, before the break-up of ice and frost-bound land; consequently they had to return on account of food-supply. I believe we get a few stragglers in this country, too, that arrive too early.

5th.—In a small plantation quite near the River Aire, where previous notes were made, one brown Wren, with a small party of Marsh-Tits. I might mention here that the Chiffchaff does not breed in Upper Airedale; so I longed to hear the song of this (to us) rarer visitor. However, patience has its limitations, even to a bird-watcher—but sing it would not—the smallness of the wing seemed to help me in deciding it to be the Chiffchaff. At the sides of the river and in the fields adjoining were many Pied Wagtails; one big flock rose high in air, and away up stream. On the 7th and 8th, on the same ground, scarcely a bird to be seen.

12th.—Reversed the walk, starting at Bingley to Saltaire, with Mr. Bedland, of the Bradford Naturalists; very few birds to note. Creepers in full song, and evidently a few pairs still breed here. One Sand-Martin within a few yards of the place where one was noted on March 31st.

Birds are exceptionally late this year, and up to this date, with the exceptions mentioned, there is hardly a migrant to be seen about here.—W. H. PARKIN (Studholme, Shipley).

NOTICES OF NEW BOOKS.

African Nature Notes and Reminiscences. By FREDERICK COURTNEY SELOUS, F.Z.S. With a "Foreword" by President ROOSEVELT. Macmillan & Co., Ltd.

"MR. SELOUS is the last of the big-game hunters of South Africa." Such is the statement of President Roosevelt, and such is the verdict of all of us. Wealthy sportsmen may still find game in South-East Africa, but the days of the old Nimrod are gone. Mr. Selous, hunting in his shirt, shoes, and soft hat, reminds one of Gordon Cumming, and the period between these two great hunters of similar garb and equal love of laying low the mighty game, marks an era which exhibits the decline and fall of the great mammalian fauna of South Africa.

In this book, much of which has been previously published in fragmentary contributions to different journals, Mr. Selous reaches his high-water mark in zoological observation, and it contains bionomical monographs of several animals. As regards the Lion this is markedly the case, and the peculiar haunts of the Inyala are focused in two tersely written and highly interesting chapters.

Of more than average importance is the chapter dealing with the Tsetse Fly, particularly in its connection with the Buffalo, and the author's conclusions as to the interdependence of these two living creatures, the diminution of the one being accompanied with the scarcity of the other; in other words, their mutual disappearance in certain once well-known fly-infested areas.

But what has particularly impressed the writer of this notice is the *experimentum crucis* afforded by Mr. Selous's observations made during his long sojourn in the South African veld, and in the bush of that region, on much of the theories of protective coloration and mimicry. As President Roosevelt, with his shrewd common sense, remarks: "His observations illustrate

the great desirability of having the views of the closet naturalist tested by competent field observers"; and, again: "The most conspicuous colors of nature, for instance, are, under ordinary circumstances, black and white. Yet we continually find black, and sometimes white, animals thriving as well as their more dull-coloured compeers under conditions that certainly seem as if they ought to favor the latter."

Mr. Selous's chapters i. and ii. may be carefully read and pondered by some of the enthusiastic missionaries in the ultra cult of "protective coloration," "recognition marks," and "mimicry." Not that these theories are repudiated so much as largely qualified, and this is the philosophical position. The argument in their favour was originally one of possibility, which rightly developed into probability; but by the vogue in which these interesting problems have been received, and the extremes to which they have been pushed, they are rapidly being relegated into the domain of unlikelihood. And this is the pity of it.

A Guide to the Elephants (Recent and Fossil) Exhibited in the Department of Geology and Palæontology in the British Museum (Natural History). Printed by Order of the Trustees.

THIS is another of those useful little handbooks by which a visitor to our National Museum may acquire a thorough knowledge of the few animals to which it rightly claims to be a 'Guide.' It is written by that well-known palæontologist, Dr. C. W. Andrews, and is, in fact, a short and handy monograph of the Proboscidea. We believe that these booklets are of the highest educational value to those visitors who wish to know not only the names and position of the preserved animals they see, but also their history in time. For a lesson on the process of animal evolution the Proboscidea afford a splendid text, and we would suggest that this inexpensive 'Guide' might be placed in the hands of schoolboys, who, after having read it, should be taken to the Museum to see the subject of its pages, which might afterwards be reperused. The evolutionary conception by this and similar means would be clearly attained,

which is seldom accomplished by the publication of "popular books" on the subject. The 'Guide' is well illustrated.

A Guide to the Gallery of Fishes in the Department of Zoology in the British Museum (Natural History). Printed by Order of the Trustees.

THIS 'Guide' has been prepared by Dr. Ridewood in daily consultation with Prof. Lankester, as we are told in the preface. The collections of Fishes in the British Museum are not only famous for their number, but for the care with which they are conserved and have been worked out. Most of these are spirit-specimens, and are studied by the ichthyologist. But in the Gallery there are exhibited preserved specimens and models which have recently been thoroughly rearranged and added to, and these appeal to the visitor, for whose instruction this handbook has been written. By its aid he can be made acquainted with all the principal types they represent, and the elements of the classification by which they are arranged. It also describes much of their peculiar structure, life-history, and distribution, thus making the Gallery to serve the purpose of a popular lecture-room, with the object-lessons round the walls. No written natural history can impart the pleasure and instruction to be derived from the visit to a good museum collection with an adequately written handbook. This one contains ninety-six figures.

EDITORIAL GLEANINGS.

THE Society for the Destruction of Vermin was formed in January, 1908, to organize a national movement for the extermination of rats and other vermin noxious to man. Among the vermin included within the scope of the Society's operations are rats, mice, sparrows, ticks, fleas, mosquitoes, and flies. It stands amply proved by the testimony and researches of many eminent scientists that rats and other vermin constitute a most serious menace to public health. They foster and disseminate disease germs, and in many instances are the leading factors in disease epidemics.

Bubonic plague is now known to be conveyed mainly by rats. In most recent outbreaks this disease has been noticed to occur first amongst the rat population of the invaded areas; from these it passes to man by means of fleas, which inoculate him with the germs they have imbibed in feeding on infected rats. It is evident that the destruction of rats is an essential, if not the most important, preventive against plague. Malaria is known to be directly conveyed to man by infected mosquitoes. The extermination of mosquitoes is being carried out very actively in numerous malarial districts with remarkable results. Yellow fever: This pestilence has been proved to be conveyed from the sick to the healthy by mosquitoes. The steps taken by the Americans in Havana afford striking demonstration of the part played by these insects in the propagation of disease. After various sanitary methods had been tested and found futile, a campaign was undertaken against the mosquitoes, and the disease disappeared as if by enchantment. Sleeping sickness: This fatal disease is conveyed and inoculated by tsetse-flies. The European Powers, alarmed at the rapid extension of the disease and the heavy mortality it is causing, have convened an International Conference of the leading scientific authorities on tropical diseases to concert methods for the destruction of tsetse-flies.

Among other examples may be mentioned enteric fever and cholera, conveyed by the house-fly; various forms of relapsing fever, by ticks and bugs; trichinosis, by the rat; and red-water fever and other diseases in cattle, by ticks. The striking discovery has recently been

made that the house-fly is a principal factor in the dissemination of the epidemic of summer diarrhoea among infants. Probably many other diseases of men and domesticated animals of which little is known are similarly conveyed by vermin.

Although the agency of vermin as disease conveyors has been suspected from the remotest antiquity, it is only of late years that it has received definite proof. As already mentioned, action has been taken as regards mosquitoes, and now, owing to the recrudescence of plague and the proof that the rat is the main agent in diffusing it, action is being taken against this animal in various countries, as, for example, in Denmark, where a special law has been enacted with the view of destroying these rodents. The fly also is receiving attention; in New York a Special Committee has just handed in its report, giving some very valuable suggestions as to the best way of dealing with the fly question. In this country reports have also been drawn up by the Public Health Committee of the London County Council and the Liverpool School of Tropical Medicine. Although the Society for the Destruction of Vermin has decided to direct its earliest operations against the rat tribe, it contemplates in the future, as opportunities may arise, the initiation of destructive measures against mice, house-flies, and the other vermin mentioned herein.

Apart from considerations of health, on economic grounds the destruction of the rat is much to be desired. The depredations of this animal are very costly. It has been computed that there are not less than thirty million rats in the United Kingdom at the present day, and that the loss through their incessant ravages amounts to some five million pounds yearly. Fields of corn are oftentimes seriously damaged; stores of meat, poultry, and cereals, both in warehouse and on shipboard, are heavily taxed; buildings are damaged; docks and wharves are overrun; and so serious have the depredations become in many quarters—notably the London Docks—that private proprietors have abandoned all hope of decreasing the plague of rats by individual efforts. The cost of the repressive measures taken against rats alone in London now exceeds ten thousand pounds a year.

The Society for the Destruction of Vermin, which is in process of incorporation under Board of Trade regulations as a public association not formed for the object of making profit, will collect information from all sources of the birth, breeding, distribution, and life-history of noxious vermin. It will pay especial attention to the part played by vermin in disease causation. Disseminate as widely as

possible the acquired knowledge by means of the general Press, and also by special reports, leaflets, and lectures. It will endeavour to make known to the public the dangers connected with each kind of vermin, the necessity for exterminating certain species, and the best and most merciful lawful methods of destruction. Carry out experiments in the field, test any promising measures suggested for the destruction of vermin, and, if funds permit, distribute gratuitously, to such persons as are unable to afford the expense, the necessary substances and apparatus. Organize, in co-operation with other associations and public bodies, a practical campaign for the destruction of vermin. (To conduct operations an Active Committee has been formed.) And encourage and assist in any legitimate way the operations of Rat and Sparrow Clubs and similar bodies. In the promotion of the above objects obtain, if possible, such Government, Municipal, or other public aid as may be thought desirable.

The services of the Society will be placed at the disposal of Municipalities, Boards of Health, Agricultural Societies, Railway, Shipping and Dock Companies, and other bodies interested in the suppression of vermin.

The Society is under the Presidency of Sir James Crichton-Browne, and Mr. A. E. Moore is its energetic Secretary. The temporary address is 1, Palace Garden's Mansions, London, W.

